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Part IX

Department of Agriculture

Science and Education Administration

Plant Biology and Human Nutrition; Competitive Research Grants for Basic Research

DEPARTMENT OF AGRICULTURE

Science and Education Administration

Plant Biology and Human Nutrition; Competitive Research Grants for Basic Research

Notice is hereby given that pursuant to the authority contained in section 2(b) of the Act of August 4, 1965, Pub. L. 89–106, as amended by section 1414 of Pub. L. 95–113, the Science and Education Administration (SEA) through its Competitive Research Grants Office (CRGO) will award competitive grants for mission-oriented basic research in four areas of plant biology (biological nitrogen fixation, biological stress on plants, photosynthesis, and genetic mechanisms for crop improvemnt) and human nutrition (nutrient requirements). Proposals may be submitted through their parent organizations by scientists associated with State agricultural experiment stations, all colleges and universities, other research institutions and organizations, Federal agencies, private organizations or corporations, and individuals.

A total of $16 million is available for such grants during Fiscal Year 1980. Of that amount $13 million (less administrative expenses) is available for plant sciences and $3 million (less administrative expenses) is available for human nutrition.

The CRGO Staff is located in Suite 103, Rosslyn Commonwealth Building, 1300 Wilson Boulevard, Arlington, Virginia 22209 (opposite the Rosslyn Station of the Metrorail Blue Line).

Proposals submitted for consideration for FY 1980 funding should be postmarked by the following dates:

Wednesday, January 2, 1980, for Genetic Mechanisms for Crop Improvement and Biological Nitrogen Fixation;

Friday, January 11, 1980, for Biological Stress on Plants; and

Friday, February 1, 1980, for Human Nutrient Requirements and Photosynthesis.

Proposals will be reviewed by a scientist serving as a CRGO Program Manager, by *ad hoc* reviewers, and by an assembled panel of scientists who constitute a spectrum of expertise for the Program to which the proposal is assigned. The Guide to Proposal Preparation for these competitive grants consists of three parts:

I. Types of Research to be Supported in FY 1980;

II. Proposal Submission;

III. Proposal Review and Evaluation.

This Notice incorporates suggestions from various agencies of the U.S. Department of Agriculture (USDA), from liaison representatives of other Federal agencies and prospective performing organizations, and from *ad hoc* groups on plant sciences and on human nutrition.

The General Provisions for Grants and Cooperative Agreements (SEA FORM 638, May 1979) apply to these grants. A copy is available upon request from the SEA Grants Administrative Management Office.

An approved final Impact Analysis Statement is available from David W. Krogmann, Head, Competitive Research Grants Office, Suite 103, Rosslyn Commonwealth Building, 1300 Wilson Boulevard, Arlington, Virginia 22209. This Notice has not been determined significant under USDA criteria implementing Executive Order 12044. It has been determined that because of the need to implement this program so that research relating to plant production can be initiated in the Spring of 1980 compliance with the notice and public procedure provisions of 5 U.S.C. 553 is impracticable and contrary to the public interest and, in accordance with E.O. 12044, that it is not possible to publish this notice in proposed form and allow 60 days for public comment.

Note.—The reporting and/or recordkeeping requirements contained herein have been approved by the Office of Management and Budget in accordance with the Federal Reports Act of 1942.

Dated: November 23, 1979.

Anson R. Bertrand,

Director, Science and Education.

Guide to Proposal Preparation

I. Types of Research to be Supported in Fiscal Year 1980

The Science and Education Administration (SEA) will award research grants for periods not to exceed five years, on a competitive basis, to support basic research underlying the mission of the USDA. Basic research grants will be considered in selected area of plant biology and human nutrition, which have been considered by a number of scientific groups to possess exceptional opportunity for fundamental scientific discovery and for contributing, in the long run, to applied research and development vitally needed on important food and nutrition problems. This grants program results from the recognition that new, innovative approaches and enhanced levels of funding are needed as we seek ways to increase food production and improve human nutrition.

Consideration will be given to research proposals which address fundamental questions in the areas noted below and which are consistent with the long-range missions of USDA. While a basic guideline for each of the programs is provided to assist members of the scientific community in assessing their interest in the program areas and to delineate certain important areas where new information is vitally needed, the guidelines are not meant to provide boundaries or to detract from the creativity of potential investigators. Accordingly, it is hoped that innovative projects in the so-called "high-risk" category as well as those which may have a higher payoff potential will be submitted.

The following guidelines are thus provided as a base from which proposals may be developed.

A. *Plant Biology.* 1. Biological Nitrogen Fixation. The most common limiting nutrient for plant growth is nitrogen. The presence of soil nitrogen is due to past accretions in nature, biological nitrogen fixation or the application of nitrogenous fertilizer. The latter represents a significant energy input in cropping and ultimately increases food costs. Thus, the enhancement of biological nitrogen fixation capacity in plant-soil microbial associations is of major importance. Research aimed at understanding nitrogen fixing mechanisms in both symbiotic and free living organisms as well as the fate of fixed nitrogen is of high priority.

In general, the objectives of this program include building a foundation of basic information concerning nitrogen fixation as it relates to enhancing the process in currently known systems and in providing a base for developing new nitrogen fixing association, by genetic transfer or other means, for crop species not now possessing such capability. Moreover the process of nitrification (the oxidation of ammonia to nitrate), the assimilation and utilization of ammonia and nitrate, and denitrification (the reduction of nitrate to volatile forms of nitrogen which are lost from the soil) all play important roles in plant growth. Soil nitrogen, whether supplied by biological nitrogen fixation or as chemical fertilizer serves to increase food production only when it is present in an available form which is not lost from the plant-soil ecosystem.

Examples of research areas encompassed in this program include: (a) Structure and mechanism of action of nitrogenase; the regulation of nitrogenase activity and synthesis; the relationship between nitrogenase and hydrogenase activities in nitrogen fixing

organisms; (b) energetics of the nitrogen fixation process including competitive processes within the plant; (c) infection by *Rhizobium* and conditions for effective nodulation; basis of the recognition process between symbiotic organisms; factors controlling symbiont specificity; competition in the soil; (d) identification of additional organisms capable of nitrogen fixation and quantitation of their contribution; (e) relation between the fixation process and the processes of assimilation, nitrification, and denitrification; (f) the development of methods for the *in situ* measurement of nitrification and denitrification, and determination of the actual extent of these processes in nature; (g) an analysis of the distribution of denitrifying and nitrifying bacteria and elucidation of control mechanisms operative on nitrogen transformations in the major species; (h) studies of the transfer and utilization of fixed nitrogen including the enzymes involved in the assimilation and dissimilation of fixed nitrogen in bacteria and crop plants; and (i) the efficiency of nitrogen utilization by crop plants in the production of food proteins.

Emphasis in program priorities will be on innovative approaches which may contribute to a thorough understanding of nitrogen cycling encompassing biochemistry, cellular and developmental biology, genetics and genetic manipulation, and other relevant life science disciplines. An understanding of these processes is essential to the development of strategies which maximize nitrogen fixation, minimize inputs of nitrogenous fertilizers and optimize their utilization in agriculture.

2. Photosynthesis. There are many indications that productivity of crop plants may be increased by increasing their photosynthetic efficiency. Basic research aimed toward providing an increased understanding of photosynthesis and associated carbon metabolism is an essential part in achieving that objective. Expansion of research is needed, but not exclusively, in three major sub-areas: (a) The identification of aspects of photosynthesis which limit the conversion of solar energy into stable chemical products which include such areas as the mechanisms of energy capture and conversion, structure, synthesis, and turnover of the photosynthetic apparatus, CO_2 fixation, photorespiration and dark respiration; (b) the relation of plant development to photosynthesis including the development of photosynthetic competence, translocation and partition of photosynthetic products and attendant energetic considerations, and design of whole leaf and whole plant structures best suited for photosynthetic productivity; and (c) the design of new methods of genetic and cellular manipulation to improve photosynthetic efficiency in plants to include studies of the chloroplast genome, of nuclear genes regulating photosynthesis, and analysis of regulatory steps controlling both nuclear and cytoplasmic genome expression and their interactions. Other research designed to generate new information in areas that relate to photosynthesis and its accompanying processes in the context of the objectives of the program may also be considered a part of this area.

3. Genetic Mechanisms for Crop Improvement. The major aim of this program is to encourage innovative or unique genetic approaches directed to the development of genetically superior varieties of agricultural crops. The approaches should be aimed at obtaining novel genetic combinations or gene modifications difficult or impossible to achieve using conventional plant breeding techniques. This research program thus will emphasize the following: (a) Cell culture studies including the regeneration of plants from single cells, cell/protoplast fusion, mutagenesis, and incorporation of foreign DNA, chromosome, or organelle; (b) development of effective cellular and molecular methods for identification of plant characteristics or genes which are significant targets for genetic manipulation; (c) development of methods for producing, selecting, and transferring desired genetic traits including both qualitative and quantitative traits; (d) acquisition of basic information on nuclear and organelle plant gene expression and diversity at the molecular, cellular, or developmental level to facilitate application to plant improvement; and (e) basic genetic studies on maintenance, alteration, and utilization of unadapted and wild germplasm. Proposals to conduct well-defined basic plant genetic studies in support of plant breeding programs and designed to improve understanding of basic genetic mechanisms of the drop are encouraged. These guidelines are not meant to exclude other new or unusual approaches to crop improvement.

4. Biological Stress on Plants. Plants are exposed to many stresses that may adversely affect their productivity and usefulness to man. This grants program will support research on stresses on plants arising from their interactions with other plants or with other biological agents such as weeds, insects, nematodes, fungi, bacteria, viruses, and mycoplasma-like organisms. The ultimate goal of the research supported by this program is to reduce losses in plant productivity from damage caused by biologically generated stresses. The program will emphasize studies that enhance our understanding of (a) how stressful interactions are established between plants and other biological agents, (b) how such interactions are influenced by environmental and other factors inherent to the interacting organisms, (c) how the interactions reduce plant productivity and usefulness to man, (d) how plants react to stresses generated by such interactions, and (e) how damage from such interactions may be reduced or eliminated. The interactions may be studied at any number of levels; i.e., population, organismal, cellular and molecular; and by various approaches including genetics, molecular biology, and biochemistry. These may include studies on plants separated from stress-causing organisms or on stress-causing organisms separated from their target plants. However, such studies should provide information that will be relevant to the understanding of the causes, consequences, and avoidance of biologically generated stresses on plants. The research supported by this program will focus on the identification of new approaches to reduction of plant stress caused by biological agents, approaches that will be both effective and compatible with social and environmental concerns.

B. *Human Nutrition.* Proposals are invited in the following subject matter area. Support will not be provided for clinical research nor for demonstration and action projects.

Human Requirements for Nutrients. Research in this program is intended to contribute to the improvement of human nutritional status by increasing our understanding of requirements for nutrients in relation to different patterns of food intake. The objective is to support basic, creative research that will help to fill gaps in the knowledge about nutrient requirements, bioavailability, the interrelationships of nutrients, and the nutritional value of foods that are consumed in the U.S. as these relate to requirements. Special attention will be given to requirements for trace constituents. Innovative approaches designed to improve methods of research and investigation that will increase the reliability and validity of research results will be given special consideration.

Proposals dealing with processing techniques should be clearly oriented towards determination of human nutrient requirements. Proposals which concern utilization or production of a food commodity should emphasize the relationship to specific human nutrient requirements. It is especially important that proposals emphasize innovative (creative), fundamental (basic) research.

II. Proposal Submission

A. *Proposal Purpose.* The Purpose of a proposal is to persuade the reviewing peer scientists and the CRGO staff that the proposed project is feasible and sufficiently meritorious to warrant support under the criteria enumerated in Part IIIB. It should be clear, concise, technically correct, and relevant to the competitive grants program. The qualifications for the investigator, the institution facilities, and the level of funding to be devoted to the proposed project should be clearly delineated.

B. *Who May Submit Proposals.* Proposals for support under the competitive research grants program may be submitted by qualified scientists associated with the State agricultural experiment stations, all colleges and universities, other research institutions and organizations, Federal agencies, private organizations or corporations, and individuals. Proposals from scientists at non-United States organizations will not be considered for support. Only in special situations, where it can be demonstrated that a proposed project will contribute directly to breakthroughs in the food and agricultural sciences, will proposals from unaffiliated scientists be given favorable consideration.

C. *Where and When to Submit Research Proposals.* Research proposals must be submitted by the time limits set below to: Grants Administrative Management Office, ATTENTION: Competitive Research Grants Program, Science and Education Administration, USDA, 1300 Wilson Boulevard, Suite 103, Arlington, Virginia 22209.

Proposals will be reviewed by peer panels (as described in Part III) which will assemble on specific dates. In order to be considered for funding during Fiscal Year 1980, the proposals must be postmarked by the following dates:

Wednesday, January 2, 1980, for Genetic Mechanisms for Crop Improvement and for Biological Nitrogen Fixation;

Friday, January 11, 1980, for Biological Stress on Plants; and

Friday, February 1, 1980, for Human Nutrient Requirements and for Photosynthesis.

If copies of the proposal are mailed in more than one package, the number of packages should be marked on the outside of each. Proposals must be sent prepaid, not collect. The acknowledgment of receipt of the proposal will contain a proposal number, and identify the cognizant CRGO program. Later inquiries, addenda, revised budgets, etc., should be addressed to the cognizant program office and be identified with the CRGO proposal number.

D. *Considerations in Submitting Proposals.*—A number of situations frequently encountered in the conduct of research require special information and supporting documentation before funding can be approved for the project. Among these are the following:

1. research which has an actual and/or potential impact on the environment;
2. research at a registered historic or cultural property;
3. research involving the use of *in vitro* generated recombinant DNA; and
4. research involving the use of human subjects, hazardous materials, or laboratory animals.

The proposal should address each relevant item and provide information on the status of any special permissions, clearances, or provisions. Further, before submitting a proposal, the endorsing authorized organizational representative should ensure that:

1. The proposed project is consistent with the policies and goals of the submitting organization;
2. the organization can make available the necessary facilities, general and special purpose equipment, and services for the conduct of the project;
3. the organization can make available the necessary personnel for the amounts of time estimated to be required;
4. the organization has legal authority to accept grants and the requisite policies, procedures, and personnel to meet the standards described in Appendix VI;
5. the total costs estimated to be required for the conduct of the project are fair and reasonable and there is a plan for meeting such costs either from grant funds or from some other source; and
6. the costs which SEA is being asked to support are allowable and the treatment of direct and indirect costs in the proposal budget is consistent with applicable Federal cost priniciples and with the policies of the submitting organization.

If not previously done, the submitting organization must also separately furnish to the grants administrative management office the organizational information and assurances contained in Appendix VI.

E. *What to Submit.*— The research proposal should be prepared on standard sized paper (no larger than 8½" x 11"), with pages numbered at the bottom, and printed only on one side of each sheet. Twenty copies of the proposal, including an original with all required signatures, are required for review by peer scientists and the CRGO staff.

Complete proposals, arranged in a standard sequence, are required to expedite review and evaluation. An administrative check should be made prior to mailing, to ensure that the items on the following checklist are included in the sequence indicated. Each item is discussed in detail in the following sections.

Checklist of complete proposal contents. Appendix formats should be duplicated for use in proposal.

1. Title Page (Appendix I)
2. Proposal Source Document (Appendix II, ORIGINAL ONLY)
3. Special Considerations (Appendix III)
4. Project Summary (1 page)
5. Project Description (15 page MAXIMUM)
6. References for Project Description
7. Vitae and Publications Lists
8. Budget (Appendix IV) and Budget Justification
9. Current and Pending Support (Appendix V)
10. Additions to Project Description (if any)
11. Appendix VI (if not previously submitted by the performing organization, 1 copy)

1. Title Page. *Format*—Appendix I is the format for the title page. The format as shown in Appendix I must be used. An original title page with all relevant signatures must be included with the original proposal. All copies of the proposal should also have a title page.

The SEA competitive research grant programs are intended to stimulate and support basic research in the plant sciences and human nutrition. Such research is national in scope, is not designed to meet the needs or address the problems of a particular State, area, or locality, does not include demonstration or pilot research projects which might have an important impact on local communities or areas, and does not involve capital construction. They are not grants-in-aid to States or political subdivisions or other organizations for which Reports of Federal Actions are required under the provisions of Treasury Circular 1082. Therefore, SEA does not require the use of Standard Form (SF 424) as prescribed by attachment M to Office of Management and Budget (OMB) Circular A–110 for use in programs covered by Part I, attachment A, to OMB Circular A–95.

Title of Proposal.—The title (80 characters maximum) will be used for the USDA Current Research Information System (CRIS), for information to Congress and for press releases. Therefore, it should not contain highly technical words. Phrases such as "Investigation of" or "Research on" should not be used. Other items of the title page are self-explanatory.

2. Proposal Source Document; only one copy required (Appendix II).

The proposal source document is an essential part of the proposal. It provides the CRGO staff with data for compiling information requested by Government agencies, the Congress, and the grantee community. The items are self-explanatory for the most part. Please note the following: (a) the Performing Organization is the Organization of the Principal Investigator where the work will be done, and it may be the same or different from the organization which receives the grant; and (b) the authorized organizational representative should be the same as the one given on the Title Page.

3. Special Considerations (Appendix III).

Research Involving Special Considerations.—Section II, D summarizes research situations which require special information and supporting documentation before funding can be approved for the project. If special information or supporting documentation is involved, the Proposal Source Document should so indicate. Since some types of research targeted for SEA support have a high probability of involving either recombinant DNA or human subjects, special instructions follow.

Recombinant DNA.—Principal investigators and endorsing performing organization officials must comply with the guidelines of the National Institutes of Health (See "NIH Guide for Grants and Contracts," Vol. 6, No. 19, Oct. 17, 1977, and subsequent revisions). A Memorandum of Understanding and Agreement and approval by the local Biohazards Safety Committee, must be provided before a grant can be awarded.

Human Subjects.—Safeguarding the rights and welfare of human subjects used in research supported by SEA grants is the responsibility of the performing organization. The informed consent of the human subject is a vital element in this process. Guidance is contained in Public Law 93–348, as implemented by Part 46, Subtitle A of Title 45 of the Code of Federal Regulations, as amended (45 CFR Part 46).

If the project involves human subjects at risk, the grantee must furnish SEA with a statement that the research plan has been reviewed and approved by the appropriate Institutional Review Board at the grantee organization, and that the grantee is in compliance with Department of Health, Education and Welfare (DHEW) policies, as amended, regarding the use of human subjects. Required documents should follow this page.

4. Project Summary.

Immediately following the certification should be a one-page Project Summary, to focus on: overall objectives and project goals; relevance and significance of the project; and experimental methods and approches.

The Project Summary is *not* intended for the general reader so should be couched in language which will be meaningful to others in field of science.

5. Project Description (15-page maximum).

a. *Introduction*—State overall objective(s) and long-term goal(s) of the proposed research. Review the most significant previous work, including your own, and describe the current status of research in this field. Document with references.

b. *Rationale and Significance*—Present concisely the rationale behind the proposed research and list specific objectives for the total period of requested support. Show how these objectives relate to potential long-range improvements in food production or human nutrition. What is the potential importance of the proposed research? Discuss any novel ideas or contributions which the project offers.

c. *Experimental Plan*—State clearly your hypotheses or the questions you will ask and give details of the research plan. Include a description of the experiments or other work proposed; the methods and techniques to be employed and their feasibility; the kinds of results expected; and the means by which the data will be analyzed or interpreted. Include, if appropriate, a discussion of pitfalls that might be encountered, and limitations of the procedures proposed. Insofar as possible, describe the principal experiments or observations in the sequence in which it is planned to carry them out, and indicate, if possible, a tentative schedule of the main steps of the investigations within the project period requested.

d. *Facilities and Equipment*—Describe the facilities available for this project, including laboratories. Point out any procedures, situations, or materials that may be hazardous to personnel and the precautions to be exercised. List major items of instrumentation and those major items of nonexpendable equipment needed to complete the work.

e. *Collaborative Arrangements*—If the proposed project requires collaboration with other research organizations, describe the collaboration and provide evidence to assure the reviewers that the organizations involved agree. If separate written assurances are to be included, they should be placed after the References to the Project Description. Indicate specifically whether or not such collaborative arrangements might have the potential for any conflict of interest. Projects involving collaboration should indicate which organization is to receive the grant since only one submitting organization can be the recipient of a grant for each proposal. Subcontract arrangements of research work should be indicated under I of the Budget (Appendix IV).

6. References to Project Description. These references should follow an accepted journal format.

7. Vitae and Publications List(s) of PI(s). Vitae of the principal investigator, senior associates, and other professional personnel should be provided to assist reviewers in evaluating the competence and experience of the project staff. This section should include curricula vitae of all key persons who will work on the project, whether or not Federal funds are sought for their support. Provide for each person a chronological list of the most representative publications during the preceding 5 years including those in press. List the authors in the same order as they appear on the paper, the full title, and the complete reference as these usually appear in journals.

8. Budget. A detailed budget is required for each year of the proposed project. The format shown in Appendix IV must be used. Funds may be requested under any of the categories listed so long as the item is necessary to conduct the research. Section 2(b) of Public Law 89–106, as amended by Section 1414 of Public Law 95–113, states that these competitive grants shall be awarded without regard to matching funds by the recipient(s) of such grants. Instructions follow for the items to be inserted in the format illustrated in Appendix IV. Use a separate page for each year and a summary page for the total project budget. Justifications must be included. Use separate pages following the budget.

a. *Salaries and Wages.*—Salaries of the principal investigator and other personnel associated directly with the research should constitute appropriate direct costs in proportion to their effort devoted to the research. Charges by academic institutions for work

performed by faculty members during the summer months or other periods outside the base salary period are to be at a monthly rate not in excess of that which would be applicable under the base salary and to other provisions of section J.6 to the cost principles for educational institutions (Office of Management and Budget Circular, OMB A-21). Grant funds may not be used to augment the total salary or rate of salary of project personnel or to reimburse them for consulting or other time in addition to a regular full-time salary covering the same general period of employment.

The submitting organization may request that senior personnel salary data not be released to persons outside the government. In this case, the item for senior personnel salaries in the formal proposal may be expressed as a single figure and the work-months represented by that amount omitted. If this option is exercised, however, senior personnel salaries and man-months must be itemized in a separate statement, two copies of which should accompany the proposal. This statement must include all of the information requested in Appendix IV for each person involved. The detailed information will not be forwarded to reviewers and will be held privileged to the extent permitted by law.

For research associates and other professional personnel, each position must be listed, with the number of full-time equivalent work-months and rate of pay (hourly, monthly or annually) indicated. For other personnel (graduate students, technical, clerical, etc.) only the total number of persons and total amount of salaries per year in each category are required. Salaries requested must be consistent with the regular practices of the institution.

b. *Fringe Benefits.*—If the usual accounting practices of the performing organization provide that the organizational contributions to employee "benefits" (social security, retirement, ect.) be treated as direct costs, grant funds may be requested to defray such expenses as a direct cost.

c. *Total Salaries and Benefits.*

d. *Nonexpendable Equipment.*—Nonexpendable equipment is defined as an item of property which has an acquisition cost of $500 or more per unit, an expected service life of 2 years or more, and does not lose its identity when joined or made a part of another piece of equipment. Organizations performing research with the support of a SEA grant are expected to have appropriate facilities, suitably furnished and equipped. Only under very unusual circumstances may grant funds be requested for office equipment and furnishings, air conditioning, automatic data processing equipment (ADPE), or other "general purpose" equipment which is usable for other than research purposes. This type of equipment requires special justification and arrangement with CRGO.

Items of needed scientific equipment or instrumentation should be individually listed by description and estimated cost and should be adequately justified. Allowable items ordinarily will be limited to scientific equipment and apparatus which is not already available for the conduct of the work. If purchase or lease of expensive, special-purpose equipment having a unit acquisition cost exceeding $10,000 is planned, the proposal must contain a certification that the equipment (a) is essential and not reasonably available or accessible to the proposed project, and (b) will be subject to reasonable inventory controls, maintenance procedures, and organizational policies designed to enhance multiple or shared use on other projects if such use will not interfere with the project for which the equipment is being acquired. Title to any nonexpendable equipment authorized to be procured under a grant will be determined prior to the award of a grant.

e. *Materials and Supplies.*—The types of expendable materials and supplies required should be indicated in general terms with estimated costs. Where substantial funds are requested, there should be a more detailed breakdown.

f. *Travel.*—The type and extent of travel and its relationship to the research should be briefly specified. Funds may be requested for field work or for travel to scientific meetings.

Travel in Canada, Puerto Rico, the United States or its possessions is considered domestic travel. All other travel is considered foreign. If foreign travel is planned in connection with the research, the proposal should include relevant information (including countries to be visited) and justification. Travel and subsistance should be in accordance with organization policy.

Irrespective of the organization policy, allowances for air fare will not normally exceed round trip jet economy air accommodations. Persons traveling under Federal grants must travel by U.S. flag carriers, if available, unless:

1. The traveler, while enroute has to wait 6 hours or more and no U.S. carrier is available during this period, and
2. The flight by a U.S. carrier takes 12 or more hours longer than a foreign carrier.

Air freight must also be under U.S. flag carriers.

g. *Publication costs.*—Costs of preparing and publishing the results of research conducted under the grant, including cost of reports, reprints, page charges or other journal costs, and necessary illustrations may be included.

h. *Computer (ADPE) Costs.*—The cost of computer services, including computer based retrieval of scientific and technical information may be requested. A justification based on the established computer service rates at the proposing institution should be provided. Reasonable costs of leasing automatic data processing equipment may be requested, if justified.

i. *All Other Direct Costs.*—Other anticipated direct costs not included above should be itemized. Examples are: space rental at research establishments away from the performing organization, minor alterations, and service charges. Reference books and periodicals may be charged to the grant only if they are related specifically to the research project. Proposed subawards should be disclosed in the proposal so that the grant instrument may contain prior approval, if appropriate. None of the research effort under a SEA grant may be contracted or transferred to another organization without prior CRGO approval.

Consultant services should be included in this section. Grantees normally are expected to utilize the service of their own staff to the maximum extent in managing and performing the activities supported by grants. Where it is necessary for a grantee to contract for the services of persons who are not its officials or employees, it is expected to do so in accordance with written organizational standards which provide for consideration of the factors outlined in the applicable Federal cost principles.

If the need for consultant services is anticipated, the proposal narrative should provide appropriate rationale and the Proposal Budget should estimate the amount of funds which may be required for this purpose. To the extent possible, consultant rates should show separate amounts for actual services and each of the components of the rate. Payments to individuals for consultant services shall not exceed the daily equivalent of the then current maximum rate paid to a GS-18 Federal employee (exclusive of indirect cost, travel, per diem, clerical services, vacation, fringe benefits, and supplies.)

j. *Total Direct Costs.*

k. *Indirect Costs.*—The indirect cost rate(s) negotiated by the grantee organization with the cognizant Federal

negotiating agency must be used in computing indirect costs for a research proposal. Determination of the appropriate indirect cost rate(s) is dependent upon a combination of factors including but not limited to physical location of the work. The proposed official responsible for Federal business relations should review this part of the proposal to see that it properly describes any particular factors which may have a hearing upon the indirect cost rate(s) applicable to the project. Normally, the rate in effect on the date the proposal is recommended for award by the CRGO Program Manager will be used.

If an organization has no established indirect cost rate, it should consult the Grants Administrative Management Office, who will establish liaison with the cognizant Federal negotiating agency for developing an acceptable indirect cost rate for the grantee.

l. *Total Direct and Indirect Costs (j. plus k.)*

m. *Less Residual Funds.*—Unused and uncommitted funds remaining at expiration of current CRGO grant.

n. *Total Amount of this Request.*

9. Current and Pending Support (Appendix V). The proposal must list all current public or private research support, in addition to the proposed project, to which the principal investigator and other senior personnel have committed a portion of their time, whether or not salary for the person involved is included in the budgets of the various projects. The proposal must also provide analogous information for all proposed research which is being considered by, or which will be submitted in the near future to, other possible sponsors including other USDA programs. Use the format of Appendix V.

If the project submitted for support has previously been funded from a source other than USDA, the items of information requested in the foregoing paragraph should be furnished for the immediately preceding funding period. This information will help the USDA analyze shifts in research support. Concurrent submission of a proposal to other organizations will not prejudice its review by CRGO.

10. Additions to Project Description. Each project description is expected by the members of review committees and the staff to be complete in itself. Distribution of additional material, other than for the records, is limited to the principal reviewers. In those instances where additional material is necessary (as for example: photographs which do not reproduce well, and reprints or other especially pertinent material which are not suitable for inclusion in the proposal), 6 copies or sets, identified by title of the research project and name of the principal investigator, should accompany the proposal.

III. Proposal Review and Evaluation

A. *Proposal Review.*—Research proposals received by CRGO will be acknowledged and assigned to the appropriate program for scientific evaluation.

All proposals will be carefully reviewed by a scientist serving as a CRGO Program Manager and by additional scientists who are experts in the particular field represented by the proposal. Program Managers will also obtain comments from assembled peer panels of scientists before recommending proposals for funding.

B. *Criteria for Selection of Projects.*—The following criteria or factors are considered in the evaluation of research proposals:

1. The scientific merit of the proposal, including the suitability and feasibility of the approaches and methodology.

2. The probability that the research will contribute to important discoveries or significant breakthroughs in food production or human nutrition, in relation to the mission of this program.

3. The qualifications of the principal investigator and other senior personnel, such as training, demonstrated awareness of previous and alternative approaches to the problem, and performance record and/or potential for future accomplishment.

4. The probable adequacy of available or obtainable facilities, equipment, instrumentation, and technical support.

C. *Revisions to Proposals During Review Process.*—Prior to recommending whether or not SEA should support a particular project, the Program Manager may engage in discussions with the proposing Principal Investigator. Should such discussions result in proposed changes which exceed 10 percent of the proposed grant amount or $10,000, whichever is less, a revised proposal budget using the format shown in Appendix IV signed by both the proposing Principal Investigator and by the authorized organizational representative, must be submitted in an original and two copies to the cognizant CRGO Program Manager for incorporation into the proposal file.

Should such discussions result in changes in the basic objectives or scope of the project as originally proposed, an appropriate proposal modification, signed and endorsed as above, must be submitted to the CRGO Program Manager.

D. *Grant Awards.*—The institutions submitting proposals judged most meritorious under the criteria in III-B above will be awarded grants for periods not to exceed five years, within the limitations of available funds.

Appendix I

Research Proposal Submitted to Competitive Research Grants Office; USDA/SEA

For Consideration by _____
(Name of program; e.g., photosynthesis)
Title _____
(80 characters or less including spaces and punctuation, see instructions)
Proposed amount _____
Proposed effective date _____
Proposed duration months _____

Principal investigator (PI) name

Submitting institution
Address of principal investigator:

Name co-principal investigator
Address of submitting institution:

Name co-principal investigator

If supplement, or renewal give previous CRGO Grant No. ——.
Make grant to _____
(Legal name of institution or organization to which grant should be made)
Internal Revenue Service Number ——;
Congressional District No. ——.
Endorsements:
Principal investigator—
Name _____
Title _____
Phone No. _____
Date _____
Signature _____
Authorized organizational representative—
Name _____
Title _____
Phone No. _____
Date _____
Signature _____
Other, if required by submitting organization:
Name _____
Title _____
Phone No. _____
Date _____
Signature _____

Proposal Source Document

Principal investigator(s) (PI) names.—First, middle, and last
PI No. 1 _____
PI No. 2 _____
PI No. 3 _____
Proposal No. (CRGO use) _____
Program (CRGO use) _____
PI No. 1 _____
City, State 2-letter abbr., and ZIP code

Department or street address (35 characters)
PI No. 1 _____
Phone and area code; and duration of proposal in months

Total requested (direct & indirect); and institute or subdivision of performing organization (35 characters)
PI No. 1 ———
Name of performing organization (35 characters)

Authorized Organizational Representative

(CRGO use)———.

First name, middle name, and last name
Phone and area code———.

Department of organizational unit (35 characters).

City, State (2-letter abbr.), and ZIP code.
(CRGO use)———.
Date received (CRGO use)———.
Grantee organization (35 characters)———.

Title of proposal (maximum 80 characters).
Program Code (information to be supplied by principal investigator.)

A. Is this proposal a renewal (request to support additional research objective) of an existing SEA grant or a new proposal to the USDA Competitive Research Grants Office?
1.—new; 2.—renewal.

B. In which area of the competitive grants program do you want this proposal considered? Select one program *only*. (CRGO may direct it to another area if appropriate.)
1.—Biological Stress on Plants.
2.—Genetic Mechanisms for Crop Improvement.
3.—Nitrogen Fixation.
4.—Photosynthesis.
5.—Human Requirements for Nutrients.

Proposal Code

A. Which of the following best describes the performing organization of the first principal investigator? Check one choice *only*.
1.—USDA/SEA Laboratory.
2.—Other Federal Research Laboratory.
3.—State Agricultural Experiment Station (SAES).
4.—Land Grant University, 1862.
5.—Land Grant University, 1890 or Tuskegee Institute.
6.—Public University or College (Non-land grant).
7.—Private University or College.
8.—Private Profitmaking Organization.
9.—Private Non-Profit Organizaton.
10.—State or Local Organization.

B. Has the first principal investigator completed the most advanced degree within the last 5 years?
1.—yes; 2.—no.

C. Will the work in this proposal deal with recombinant DNA or with human subjects?
1.—neither; 2.—DNA; and 3.—human subjects.

D. Congressional District of the grantee organization——.

upport Code

A. Will this proposal be sent to another granting agency? If so, indicate.
1.—None.
2.—Other UDA units.
3.—NSF.
4.—NIH.
5.—DOE.
6.—Other (describe).

Special Considerations

Check appropriate statements. Supply additional information when necessary.
—"This project does not involve human subjects."
—"This project involves human subjects. It was approved by the Institutional Review Board on (date) ——, (is scheduled for review by the Institutional Review Board on (date) ——)." See DHEW regulations regarding the use of human subjects, appearing in Title 45, Code of Federal Regulations, Part 46, Subtitle A.
—"This project does not involve recombinant DNA research."
—"This project involves recombinant DNA research. It was approved by the institutional Committee on (date) ——. (Supply appropriate documents as required by "NIH Guide for Grants and Contracts," Vol. 6, No. 19, October 17, 1977, or subsequent revisions thereto)."

Appendix IV.—*Budget Duration proposed —— Mo.*

Organization and address:
Principal investigator(s):

	CRGO funded work months			Funds requested by proposer	Funds granted by CRGO if different (CRGO use only)
	Cal.	Acad.	Summer		
A. Salaries and wages:					
1. No. of senior personnel:					
a.——(Co)-PI(s)				$	$
b.——Senior associates				$	$
2. Other personnel (nonfaculty):					
a.——Res. assoc.-postdoc.				$	$
b.——Other professionals				$	$
c.——Graduate students				$	$
d.——Pre-baccalaureate students				$	$
e.——Secretarial-clerical				$	$
f.——Technical, shop, and other				$	$
Total salaries and wages				$	$
B. Fringe Benefits (if charged as Direct Costs)				$	$
C. Total salaries, wages, and fringe benefits (A+B)				$	$

Appendix IV.—*Budget Duration proposed —— Mo.—Continued*

	CRGO funded work months			Funds requested by proposer	Funds granted by CRGO if different (CRGO use only)
	Cal.	Acad.	Summer		
D. Nonexpendable equipment (list items and dollar amounts for each item):					
Total nonexpendable equipment				$	$
E. Materials and supplies				$	$
Total materials and supplies				$	$
F. Travel 1. Domestic (including Canada)				$	$
2. Foreign (list destination and amount for each trip)				$	$
G. Publication costs/page charges				$	$
H. Computer (ADPE) costs				$	$
I. All other direct costs (list items and dollar amounts. Details of subcontracts, including work statements and budget, should be explained in full in proposal.)				$	$
J. Total direct costs (C through I)				$	$
K. Indirect costs (specify rate(s) and base(s) for on/off campus activity. Where both are involved, identify itemized costs included in on/off campus bases in remarks)					
Total indirect costs				$	$
L. Total direct and indirect costs (J plus K)				$	$
M. Less residual (for further support of current project)				$	$
N. Total Amount of this Request (L Minus M)				$	$

Remarks: Use extra sheet if necessary:

NOTE: Signatures required only for revised budget. This is Revision No.

Signature of principal investigator:
Date of signature:
Typed or printed name and title:
Signature of authorized organizational representative:
Date of signature:
Typed or printed name and title:

Appendix V.—*Current and Pending Support*

Name	Project agency	Amount [1]	Expiration date	Percent of effort committed	Title of project
PI:					
Current:					
a.					
b.					
c.					
Pending:					
a.					
b.					
c.					
Co-PI:					
Current:					
a.					
b.					
c.					
Pending:					
a.					
b.					
c.					
Other:					
Current:					
a.					
b.					
c.					
Pending:					
a.					
b.					
c.					

Comments (if any): List titles of research projects below. Use Additional sheets if necessary.

[1] Indicate whether total or annual rate.

Organizational Information and Assurances

A. *Prospective Grantee Organizational Information*

The following information is to be submitted:

a. Organization Affiliations. Describe relationship of the organization to a parent organization or to subsidiaries or other affiliates. If the organization is a successor in interest to a predecessor or if changes in organization affiliation are anticipated, describe briefly.

b. Statement of Purposes and Powers. Enclose an official or published statement of the major purposes of the organization and certify as required in B, below, as to the powers which have been granted to it to enter into contractual relationships and/or to accept grants (e.g., articles of incorporation, terms of reference, or by-laws).

c. Key Officials:

1. Chief Executive;
2. Authorized Organizational Representative; and
3. Business Officer.

d. Affiliations of Key Officials. If the organization is other than a college or university or a State or local government, indicate whether or not each official listed in (c) above is affiliated with any Federal, State, or local agency or with any college or university. If so, describe such affiliation.

e. Whether or not the organization currently is a grantee or contractor of any component of the U.S. Department of Health, Education, and Welfare. (Note: This information will assist in implementing certain interagency procedures for which DHEW is the lead agency.)

f. If other than a college or university or a State or local government, also submit the following:

1. A certified statement of financial conditions (usually by Certified Public Accountant) covering at least the preceding 2 years; and
2. Bank or other references.

B. *Required Certification*

SEA requires that a prospective grantee organization submit a certification substantially as follows, signed by the Chief Executive Officer or authorized organizational representative:

a. I certify that (name of institution or organization) has legal authority to accept grants as evidenced by the attached (describe document), and the requisite policies, procedures, and personnel to ensure stewardship of Federal funds and management of Federally supported projects, specifically including standards for financial management, procurement, and property management, which meet those described in Attachments F, N, and O to OMB Circular A–110. (Note: In the event this is not the case, list exceptions and provide a realistic estimate of when such standards might be met.)

b. Each proposal to the SEA Grants Administrative Management Office will be consistent with the policies and goals of proposed grantee and will be submitted in accordance with its procedures and pursuant to appropriate authority.

c. In the event that a grant is awarded as a result of any such proposal, I agree that proposed grantee organization will:

1. Make available the necessary facilities, equipment, services, and personnel to conduct the project substantially as outlined in the proposal or such modifications thereof as may be mutually agreed;
2. Conduct such project oversight as may be appropriate, manage the Federal funding with probity and prudence, and comply with all the terms and conditions of the grant; and
3. Comply with all applicable laws and regulations.

Appendix VI

Not Required if Previously Submitted to CRGO—Assurance of Compliance With the Department of Agriculture Regulations Under Title VI of the Civil Rights Act of 1964 (as Amended)

Legal name of proposed grantee———— (hereinafter called the "Applicant") hereby agrees that it will comply with Title VI of the Civil Rights Act of 1964, as amended, and all requirements imposed by or pursuant to the Regulations of the Department of Agriculture, 7 CFR Part 15, Subpart A, issued pursuant thereto, to the end that, in accordance with Title VI of that Act and the regulations, no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity for which the Applicant receives Federal financial assistance from the Department of Agriculture; and hereby gives assurance that it will immediately take any measures necessary to effectuate this agreement.

This assurance is given in consideration of and for the purpose of obtaining any and all Federal grants, loans, contracts, property, discounts or other Federal financial assistance extended after the date hereof to the Applicant by the Department, including installment payments after such date on account of applications for Federal financial assistance which were approved before such date. The Applicant recognizes and agrees that such Federal financial assistance will be extended in reliance on the representations and agreements made in this assurance, and that the United States shall have the right to seek judicial enforcement of this assurance. This assurance is binding on the Applicant, its successors, transferees, and assignees, and the person or persons whose signatures appear below are authorized to sign this assurance on behalf of the Applicant.

Dated: ————

Authorized Organizational Representative

(Grantee's Mailing Address)

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